AMENDMENTS TO THE SPECIFICATION

Please replace Paragraphs [0001] - [0003], [0005], [0014], [0024] - [0026], [0034], [0035], [0046], and [0050] with the following paragraphs rewritten in amendment format:

[0001] The invention relates to a prefilled syringe for medical purposes with a syringe barrel, a syringe plunger disposed therein and displaceable by means of a plunger rod, with an end plug closing off the cannula end of the syringe barrel and provided with a through-channel closable by a ~~mem-brane~~membrane, with a finger support disposed at the end of the syringe barrel opposite the end plug and having a through-hole for the plunger rod, and with a thread system that cooperates with the plunger rod and the finger support.

[0002] Syringes of the kind addressed here are known (DE 196 38 940 C2). Their characterizing feature is that the inner space of the syringe barrel is tightly closed off by the membrane in the end plug. For the syringe contents to be delivered, the membrane must be ruptured. This is brought about by the pressure created in the syringe barrel as a result of the displacement of the syringe plunger which finally causes the membrane to burst. It is also known to provide a pin disposed so that when the membrane is deflected it is pierced by the pin, and the syringe contents can be ~~de-livered~~delivered through a cannula. It is also known to provide a thread system that permits a defined ~~ad-vance~~advance of the plunger rod and of the syringe plunger connected therewith. For this purpose, the plunger rod is provided with an outer thread that cooperates with an inner thread disposed in the region of the finger support.

[0003] We have found that the point in time at which the membrane is pierced is not always exactly ~~re-producible~~reproducible. Sometimes the membrane does not burst even when the plunger rod has been ~~dis-placed~~displaced over the entire extension of the thread. Sometimes the membrane bursts too early, namely when the thread of the plunger rod is still engaged in the thread in the finger support. It is then necessary to turn the plunger rod further until the outer thread of the plunger rod has been screwed completely through the inner thread of the finger support. Only then is the plunger rod detached from the finger support and becomes axially displaceable. Only then can the plunger rod be displaced and deliver the contents of the syringe barrel.

[0005] To reach this objective, we propose a prefilled syringe ~~having the features indicated in claim 1~~. It is characterized in that the thread system is provided with a thread sleeve having an inner thread and which is detachably connected to the finger support, said inner thread cooperating with an outer thread on the plunger rod. The thread system makes it possible to turn the plunger rod so that said rod is displaced into the inner space of the syringe barrel whereby the syringe plunger is also displaced in the direction of the cannula side of the of syringe barrel. This creates pressure inside the syringe barrel causing the membrane to bulge out. Once said membrane bursts, the turning movement of the plunger rod can be discontinued. Said rod can now be subjected to a force acting in the direction of the plunger rod to displace the plunger rod inside the syringe barrel. If the outer thread of the plunger rod is still engaged with the inner thread of the thread sleeve, said sleeve can be pushed out of the finger support by the force acting in the direction of the plunger rod. By the fact that the finger support is

not rigidly coupled with the plunger rod, the axial movement to advance the plunger rod and the syringe plunger can take place even if the ~~mem-brane~~membrane bursts at a point in time at which the outer thread of the plunger rod is still engaged in the inner thread of the thread sleeve.

[0014] Syringe 1 shown in FIG. 1 has a hollow syringe barrel 3 the inner space 5 of which is filled with a substance 7 provided for an injection. In inner space 5 is disposed a syringe plunger 9 that is movable in the longitudinal direction of syringe barrel 3. In a known manner, the outer diameter of the elastic syringe plunger is somewhat greater than the inner diameter of syringe barrel 3 so that, on the one hand, inner ~~space5is~~space 5 is tightly closed off by syringe plunger 9 and, on the other, when syringe plunger 9 is displaced, substance 7 cannot leave inner space 5, which results in a ~~pres-sure~~pressure build-up.

[0024] FIG. 2 shows the syringe of FIG. 1 in a second functional position. Equal parts are referred to by the same reference numerals. To avoid repetition, the reader is therefore referred to the ~~de-scription~~description of FIG. 1.

[0025] The second functional position according to FIG. 2 is characterized by the fact that when plunger rod 11 is turned in the direction of arrow 37, outer thread 29 of plunger rod 11 meshes with the inner thread of thread sleeve 27 and plunger rod 11 is displaced inside syringe barrel 3. Syringe plunger 9 which is coupled with plunger rod 11 is thereby pushed in the direction of cannula 23. This generates pressure in free space 5. As a result, membrane 19 bulges outward, namely in the direction of cannula

23 and is finally pierced by the inner pressure. The piercing of the membrane can be heard and felt, because the force needed to turn plunger rod 11 is ~~mar-kedly~~markedly reduced. On further turning of plunger rod 11, syringe plunger 9 moves further in the direction of cannula 23, the gas present in inner space 5 is driven out and syringe 1 is freed of air, as defined. Finally, a drop 39 of substance 7 can emerge from cannula 23 making it clear to the user that membrane 19 was torn and that syringe 1 was deaerated. As can be seen, thread system 25 makes it possible to deaerate syringe 1 accurately and very sensitively in a simple manner.

[0026] FIG. 2 shows that in the exemplary embodiment of syringe 1 in the second functional position as shown here, the outer thread of plunger rod 11 is still engaged in the inner thread of thread sleeve 27. In other words, here an axial coupling between plunger rod 11 and finger support 13 still exists. Because finger support 13 is firmly connected with syringe barrel 3, with such coupling plunger rod 11 can, in principle, not be displaced further in the direction of cannula 23. In this case, however, thread system 25 is provided with a thread sleeve 27 which is detachably ~~con-nected~~connected to finger support 13. By the pressure acting on plunger rod 11 in the direction of cannula 23, thread sleeve 27 can be separated from finger support 13 and, hence, plunger rod 11 together with syringe plunger 9 can be pushed into inner space 5 of syringe barrel 3 to deliver substance 7 through cannula 23.

[0034] Preferably provided here, however, is positive locking brought about by a projection 51 extending from finger plate 47 and engaging in groove 53 provided in thread sleeve 27. Conversely, ~~posi-tive~~positive locking can also be achieved by

providing a projection on thread sleeve 27 that engages in a groove of finger plate 47. Moreover, it is possible to provide several projections and grooves to ensure that relative rotation between thread sleeve 27 and finger support 13 is prevented.

[0035] FIG. 5 shows an exploded view of finger plate 13 shown in FIG. 4. Equal parts are indicated by the same reference numerals, the reader therefore being referred to the explanation provided for FIG. 4. From the exploded view it is clear that on its outside thread sleeve 27 is provided with an annular ridge 55 which engages in an annular groove 57 of finger plate 47. This ~~repre-sentation~~representation also shows clearly projection 51, which serves as positioning cam and the ~~corres-ponding~~corresponding recess in thread sleeve 27 referred to as groove 53,

[0046] Thread system 25 then brings about, as shown in FIG. 2, a displacement of syringe plunger 9 which causes pressure to be generated in inner space 5, said pressure causing membrane 19 to bulge out in the direction of cannula 17. In a first[[--]] preferred[[--]]embodiment, the bulging alone causes membrane 19 to burst when plunger rod 11 is screwed further into syringe barrel 3. It is also possible, however, as was explained by reference to FIG. 6, to provide in the immediate vicinity of membrane 19 a pin 73 which when the membrane is caused to bulge makes a tear in it leading to the defined bursting. Thread system 25 is configured so that in finger support 13 the turning motion of plunger rod 11 is decoupled from an axial movement of plunger rod 11 in inner space 5 of syringe barrel 3. The advantage of this is that after the bursting of membrane 19 and optionally after the deaeration of inner space 5 the axial displacement of the plunger rod can be carried out independently of the instantaneous

position of outer thread 29 in inner thread 59: As shown in FIG. 3, when ~~pres-sure~~ pressure is exerted on plunger rod 11 in the direction of arrow 41, thread sleeve 27 is detached from finger plate 47 in finger support 13 so that plunger rod 11 together with syringe plunger 9 is freely movable independently of thread system 25. This design ensures that the axial decoupling of plunger rod 11 from finger support 13 no longer depends on the system accuracy and on tolerances specified for the fabrication of the syringe.

[0050] The fact that during the axial insertion of plunger rod 11 into inner space 5 the thread sleeve is separated from finger support 13 provides additional safety in the use of syringe 1: By turning plunger rod 11 back, thread sleeve 47 can no longer be returned to its starting position. A new use of syringe 1 is thus made impossible. In other words, a contaminated syringe is thus ~~pre-vented~~ prevented from being reused. This ensures that the syringe can be used only once.